**Azbil Corporation**

Chilled Water Plant District Cooling, Large Building, FA Factory and Smart City Energy Center
CO_2 reduction at heat source plant through optimized control (U-OPT™)

Features

◆ Reduce CO_2 emissions by optimizing the operation of District Cooling and heating heat source facility and Self heating heat source facility for large Buildings

◆ Reduce CO_2 emissions by optimizing the operation of Utility Plant for FA Factories

◆ Reduce CO_2 emissions by optimizing smart city/energy supply center operations (cogeneration plant and heat source unit, etc.)

◆ Optimized operation of private power generation system during DR response

◆ Further CO_2 reduction by operating with high-efficiency equipment (inverters, etc.)

◆ CO_2 reduction effect of 3-6% due to operational optimization

◆ This solution is very effective CO_2 reduction method with "short construction period" and "high investment effect"

◆ Solutions centered on data science, AI, optimization technology, and process simulation

Overview or Principles
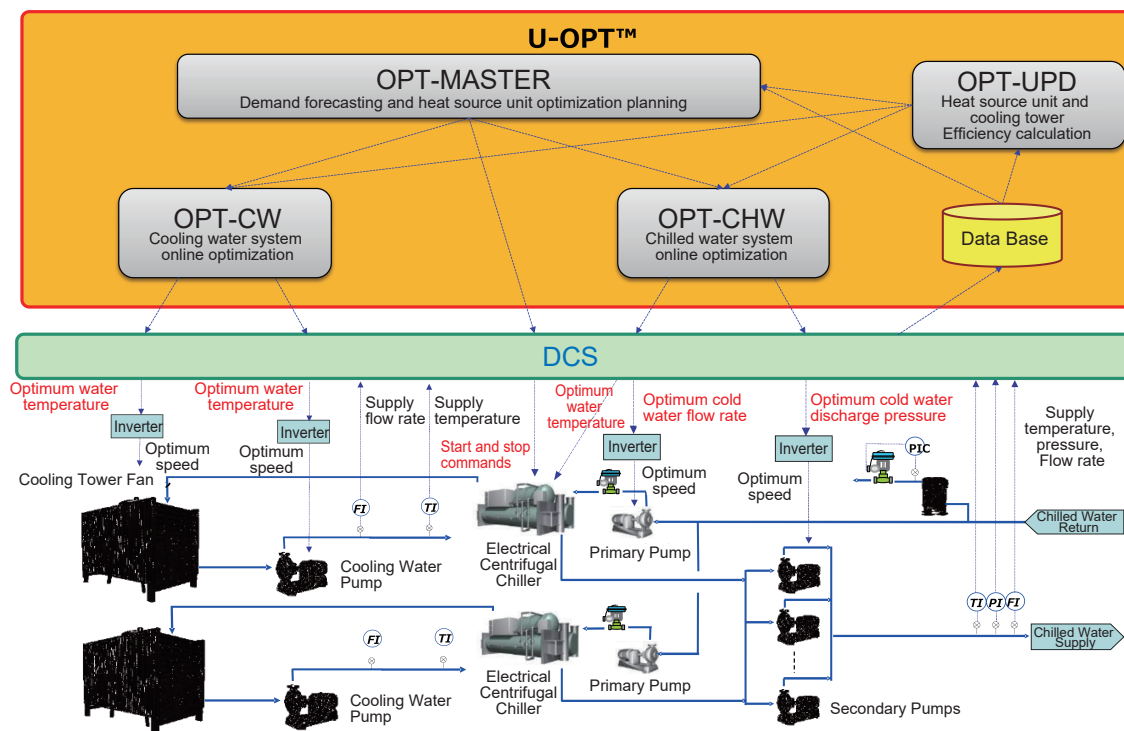
This solution U-OPT provides optimized "On Line Control" and "Guidance" for Utility Plant (Cooling towers, Various Type of Chillers, Pumps and Co-generation System, etc.) and then achieves CO2 reduction.

This solution is Windows application and Various control systems (DCS, PLC system, etc.) can be easily connected with this solution through OPC (OLE for Process Control).

It consists of the following four modules, and it is also possible to introduce each module.

1) OPT-MASTER (Demand Prediction and Optimization for Chiller and Thermal Storage Tank Scheduling.)
   => Saving coming from Chiller selection and thermal Storage Tank usage up to 24 hours in advance.

2) OPT-CHW (online optimization, optimization of Chilled Water System, calculate best Leaving Temperature and Chilled Water Flow Rate) => Saving coming from Chiller and Chilled Water Pump

3) OPT-CW (online optimization, optimization of Cooling Water System, calculate best CT Numbers and Fan Speed and Condense Water Flow Rate) => Saving coming from Chiller and Cooling tower system

4) OPT-UPD (update equipment efficiency for each module.) =>This function keeps each module accurate.
   This solution includes "AI technology" for demand forecasting, "Data Analysis technology" for equipment efficiency, "Mixed integer programming" for multi-period optimization, and "Simulation Technology" based on thermodynamics such as vapor-liquid equilibrium for Cooling tower System.
   When introducing this solution to an existing control system (DCS, SCADA, PLC system), this system can be easily connected through OPC and realize Automated Optimal Operation with existing control system.

Energy saving effects & special notes

◆ This solution maximizes overall energy efficiency and reduces energy usage by adjusting the operation of individual equipment

◆ For this Operation Optimization, no need to upgrade or replace existing facility including control system. Therefore, compared to the energy-saving approach by replacing equipment, this has the characteristics of 1) shorter project period, 2) less investment, and 3) higher cost-effectiveness.

◆ In general, factory and building facilities are designed for maximum demand, so when operating with intermediate demand, adjustments to meet demand fluctuations are required. At this time, if the energy supply side consists of multiple facilities, there is room for more efficient energy use by distributing the load based on the difference in energy efficiency.

◆ Benchmarks for CO_2 reduction, cost reduction and energy reduction are 3 to 6%.

◆ Received Singapore Apex Corporate Sustainability Award 2021 from Global Compact Network Singapore.

◆ At the COP26 Japan Pavilion, RENKEI CONTROL was introduced as a Japanese low-carbon technology
EXHIBITION - Green innovation to contribute to energy transition in the Asian region with JCM and CEFIA | COP26 JAPAN PAVILION - Ministry of the Environment (env.go.jp)

Installation in Practice or Schedule

Domestic   District Cooling and Heating Plant and Airport (10 locations)

Chilled Water Plant for FA Factory (8 locations)

Optimized operation of cogeneration facility by energy management projects (3 locations)

Tokyo Rinkai Heat Supply Corporation: Delivery case examples in industrial field | **Azbil Corporation (formerly Yamatake Corporation)** (azbil.com)

Ikebukuro District Heating and Cooling Co., Ltd: Delivery case examples in industrial field | **Azbil Corporation (formerly Yamatake Corporation)** (azbil.com)

Narita International Airport Central Heating and Cooling Plant: Delivery case examples in building field | **Azbil Corporation (formerly Yamatake Corporation)** (azbil.com)

Toyota Motor Corporation Tahara plant: Delivery case examples in industrial field | **Azbil Corporation (formerly Yamatake Corporation)** (azbil.com)

Overseas   District Cooling Plant in Singapore (3 locations)

Energy Supply enter for Smart City in Thailand (One location (under construction))

Chilled Water Plant for FA Factory in Korea (One location)

Keppel DHCS Pte Ltd: Delivery case examples in industrial field | Azbil Corporation (formerly Yamatake Corporation) (azbil.com)

Contact:	**Azbil Corporation**
	Building System Company, Global Sales Headquarters
	TEL: +81-3-6205-7017
	URL: https://www.azbil.com/